Tulare Irrigation District

Drought Management Plan

INTRODUCTION

PURPOSE OF PLAN

The Tulare Irrigation District (District) has historically experienced drought conditions whereby the annual precipitation is significantly below the region's recorded average, and surface water supplies are severely diminished. In some cases the District has experienced drought conditions that have been so severe that surface water supplies have been too low to convey base flows to system turnouts without excessive seepage losses. The District has experienced six of those years, three of which have occurred since 2012 to 2015. The four consecutive years of drought conditions caused the Governor of California to issue Executive Order B-29-15[1] which required the District to create and adopt the Tulare Irrigation District Drought Management Plan (Drought Plan). The objective of the Drought Plan is to establish the protocols of determining drought conditions, how to manage District water operations and its surface water supplies during a drought, and how to prepare for future droughts.

AGRICULTURAL WATER MANAGEMENT PLANNING & DROUGHT MANAGMENT PLANNING

As an irrigation district within the state of California that serves surface water to an area greater than 25,000 acres, the District has developed an Agricultural Water Management Plan (AWMP) to comply with the California Water Code. The first plan was submitted to the California Department of Water Resources (DWR) in December 2012 and was subsequently approved by DWR. On January 17, 2014, in response to the recent drought conditions, Governor Brown declared a State of Emergency. State agencies were directed to assist those throughout the state with addressing drought concerns. On April 1, 2015, as drought conditions continued to persist, the Governor issued Executive Order B-29-15. Under the Executive Order the Governor directed agricultural water suppliers that supply water to more than 25,000 acres to create detailed drought management plans.

Drought management plans are intended to detail how a water supplier prepares for drought conditions and manages water supplies during a drought. The plan, once developed, becomes part of the DWR required

[1] Executive Order B-29-15 (April 1, 2015) http://gov.ca.gov/docs/4.1.15_Executive_Order.pdf

AWMP. At each successive update of the AWMP the agency can revisit the practices and adjust the drought management as needed.

DROUGHT AND WATER MANAGEMENT TOOLS

Provided below is a list of resources that provide drought related guidance:

- **Tulare Irrigation District Website** - The District provides notices to landowners regarding District activities including water conditions and drought declarations. More information can be found at http://www.tulareid.org/.
- **DWR Drought Conditions** - To determine the current water conditions in the State and/or regions visit http://www.water.ca.gov/waterconditions/.
- **DWR Water Use Efficiency** – The DWR Water Use Efficiency division makes available technical expertise, provides information on the CIMIS weather station network, carries out demonstration projects and data analysis to increase water use efficiency, and provides water users with loans and grants to achieve water use efficiency projects. More information can be found at http://www.water.ca.gov/wateruseefficiency/.
- **U.S. Bureau of Reclamation Drought Response Program** - The USBR provides federal water contractors and other water agencies with a broad view of drought conditions in the western United States. The agency also provides technical assistance, grants and loans, and expertise in drought management planning. More information can be found at http://www.usbr.gov/drought/.
- **USDA Disaster and Drought Information** – The USDA provides services and programs aimed at helping agricultural producers and communities in dealing with the impacts of a drought. More information can be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

PLAN ELEMENTS

HYDROLOGIC CONDITIONS OF DROUGHT

The District typically utilizes two seasonal periods during the year to establish the anticipated water year conditions, thereby projecting the drought conditions and resulting irrigation supply availability. These periods are (a) the winter recharge assessment and (b) the summer irrigation declaration.

The District uses several forecasting tools to determine the surface water allocations:

1. California Cooperative Snow Surveys, Bulletin 120 report that is produced between February and May of each year, in particular for the Kaweah River watershed.
2. United States Bureau of Reclamation forecasting on the San Joaquin River watershed along with allocation determinations. These forecasts are delivered to the District on a monthly basis.
3. Snow sensor readings that are available for public access on the San Joaquin and Kaweah watersheds and available via the internet.

The District tracks the winter rainfall and snowfall via the sources cited above. The first surface water projection for the District is typically provided to the Board of Directors at its March Board meeting. The projection is initially formulated by the District Watermaster using the information that is obtained through the winter. This first forecast will typically use the February Bulletin 120 Snow Survey to estimate runoff in the Kaweah and San Joaquin watersheds and give the Board an idea of what type of surface water runoff will be available and the resulting entitlement allocations to the District. The Board reviews this recommendation then provides guidance to the Watermaster regarding upcoming irrigation delivery periods. Generally the Board will determine that the water year is trending towards dry, average or wet with the first water supply projection in hand. This will help guide the District in its decision making until the second projection is made. The Board however can issue a Drought Stage declaration during this first period if supply forecasts justify that decision.

As the year progresses the next critical point is the availability of the April Bulletin 120 Snow Survey results. This information, along with other snow sensor readings and USBR allocations for Friant Unit supplies, are delivered to the Board in May of each year. At this time the Board will determine the type and extent of summer irrigation run that will take place and/or establish the Drought Stage for implementation. If there is a sufficient supply of surface water (generally in average and wet years), the District Board will use the projection to establish an irrigation delivery period. However, if the water year projection is sufficiently dry, the Board can either establish Drought Stage in order to implement a water allocation process or cancel any previously-scheduled summer irrigation run.

DETERMINATION OF WATER ALLOCATIONS

During periods where the District surface water supplies are limited, allocations to landowners are estimated by the Watermaster and approved by the Board. The guidelines that are used to estimate the allocations are as follows:

1. Upon establishing that the District will encounter an irrigation run whereby surface water supplies will be curtailed, the Watermaster shall use available water supply forecasts to determine the estimated amount of water that is available for distribution to landowners during the irrigation season (typically June to September).

2. The Watermaster shall determine the net amount of water that is available for delivery to turnouts, which accounts for losses within the District distribution system.
3. Utilizing previous year crop surveys the Watermaster shall determine the likely cropped acreage for the upcoming year.
4. The Watermaster, with Board approval, shall allocate the water over a determined period of time. A Drought Proration Start Date and Finish Date shall be established.
5. Based on the Start Date and Finish Date the Watermaster can allocate the available water on a per-acre allocation by utilizing the following equation:

$$Water\ Allocation = \frac{Available\ Net\ Water\ Supply\ (Acre\ Feet)}{Estimate\ Cropped\ Acreage\ (acres)}$$

Allocation determinations will be sent to landowners via our website, email lists and individual mailers sent to addresses on file with the District.

OPERATIONAL ADJUSTMENTS

During drought conditions the District adjusts its delivery of surface water by operating in what is termed "Conservative" mode. During conservative mode the District delivers water only through channels that are required to deliver water to turnouts and minimizes the use of canals and ditches that are not needed. The District also targets channels that have lower losses and avoids those that have higher losses such as Packwood Creek and Cameron Creek.

The District also utilizes recharge/regulation basins differently during Conservative mode. When in Conservative mode the District will either bypass recharge/regulation basins or only utilize cells within the basin that are maximized for regulation and not for recharge. These cells are often compacted and have little to no losses through the system. Outside of Conservative mode, all basin cells are kept full or near full, and basins are thereby used for both flow regulation and for infiltration recharge.

DEMAND MANAGEMENT POLICIES

The District does not participate in the cropping decisions made by landowners on an annual basis. However, the District does participate in two different programs that have demand management influences: 1) on-farm water efficiency projects and 2) on-farm recharge programs.

The District has participated for several years with the Natural Resources Conservation Service (NRCS) to promote and fund on-farm water efficiency projects. These projects have included such practices as drip irrigation, micro sprinkler irrigation, canal to pipeline conversions and tailwater return systems. Each of these on-farm practices lower the surface water demands of the District.

The other program that is being developed and tested within the District is an on-farm surface water recharge program. This aims to promote the application of surplus water during winter months to various crops in excess of crop demand to achieve groundwater recharge, while not causing any harm to crops. In this way the District not only meets winter irrigation needs but also reduces the amount of water that is required in the future by virtue of pre-irrigation applications. More lengthy surplus deliveries also ultimately provide direct percolation to the underlying aquifer system.

ALTERNATIVE WATER SUPPLIES

The District has historically participated in water exchanges to support the conjunctive-use operations strived for by the District. The District typically delivers dry-year water to an exchange partner in return for a larger amount of wet-year water. The ratios that are typically negotiated, based upon individual terms, range from 2:1 to 4:1. The wet-year water is utilized to meet crop demands when it is possible, but a majority of the water is utilized for groundwater recharge activities. When the District experiences drought conditions or the lack of surface water, landowners can then turn to groundwater to help meet their crop demands, making use of the previously-stored recharge water.

The District has also recently entered into agreement with the City of Visalia to take delivery of tertiary-treated wastewater from the City's wastewater treatment plant. The City is currently in the process of completing an upgrade to their wastewater treatment plant that will produce tertiary-treated water that essentially meets the requirements of Title 22, and can be delivered to irrigate crops without any restrictions. This arrangement will add approximately 11,000 acre-feet of water annually to the District's supply for delivery within its northwestern quadrant.

The backstop supply source, usually as a last resort for many landowners, is groundwater. In wetter years the District can meet most of the irrigation demands of the crops within the District. When surface water supplies fall short of the crop demands, farmers will then turn to the use of groundwater wells that are situated on each ranch or parcel.

STAGES OF ACTION

During the course of the water year the District will make projections of the water conditions as discussed in the section – Hydrologic Conditions of Drought. In the event water supplies fall within specific conditions as listed blow, the Board shall adopt the following stages:

Stage 1 – Water Alert

During a Stage 1 drought condition the District experiences supplies that are slightly restricted. This would be in years were the initial forecast is approximately 65% of the April to July runoff. Stage 1 is designed to bring public awareness to possible surface water shortages to the District and the surrounding area.

At the beginning of a dry year, the District has no certainty as to whether conditions will persist further into drought territory. Therefore, the District can establish a Stage 1 Water Alert, which would request voluntary water reduction measures by landowners to prepare for deepening drought conditions. District staff will implement and outreach program to educate landowners regarding the status of District surface water supplies and any estimation of water shortages that may be expected.

Actions to be implemented during Stage 1 Water Alert include:

1. During late winter and early spring the Watermaster will be monitoring rainfall totals and reservoir levels to estimate the potential irrigation supply for the year. This supply number will be presented to the Board on a monthly basis.
2. When the Board makes a determination that the District is in a Stage 1 Water Alert status, staff shall alert all water users via the District website, email lists and notification letters.
3. Water notices sent shall indicate the Stage 1 Water Alert status and request that voluntary water savings measures be taken. Recommended water savings measures shall be included for landowners to utilize.

Stage 2 Water Supply Limitations

The District shall implement a Stage 2 Water Supply Limitation if the Watermaster and the Board determines that water supply conditions are anticipated to be drier than the Stage 1 forecast and that further restrictions on surface water supply are likely. During this stage of water supply shortage the District will experience limited surface water allocations and must determine a likely allocation to landowners based upon the Determination of Water Allocations Section as previously described herein.

Actions to be implemented during a Stage 2 Water Supply Limitation:

1. The Watermaster shall determine a Water Allocation per the details listed in the Determination of Water Allocations Section.
2. The Board shall approve the Water Allocation.
3. Landowners shall be notified of the Water Allocation. Notification shall come in the form of email notification, website notification and letter notification.
4. District staff shall carry out the irrigation run by limiting the surface water deliveries to landowners based upon the Water Allocation.

Stage 3 No Surface Water Irrigation Supplies

The District shall establish a Stage 3 No Surface Water Irrigation Supply when the District is not allocated sufficient surface water supplies from the Friant-Kern Canal or the Kaweah Riverto establish and maintain an irrigation run of reasonable duration. Due to prior water exchange agreements and/or limited to no allocation from either of the District's surface water supply sources, the Board can approve a cancellation of any previously-scheduled irrigation run period.

Notification to landowners shall take place by posting notices on the District website, sending emails to current email lists and sending notifications via individual mailers.

COORDINATION AND COLLABORATION

The District has many long-standing relationships with local agencies that have been successful in implementing projects and fostering water management programs within the area. The District has enjoyed financial support from the City of Tulare since the inception of the District; however, a formally recognized relationship began in the late 1940's. During this period the District agreed to accept storm water runoff from the City into the District distribution system. In return the City would continue to pay the land assessment charges to the District as land was annexed into the City. In later years the relationship blossomed into a groundwater recharge program, whereby the two entities co-venture on recharge projects and the District utilizes these projects to provide groundwater recharge nearby the City's municipal well field.

The District has also developed a working relationship with the City of Visalia. That City has partnered with the District to exchange tertiary-treated wastewater for surface water recharge upgradient from the City's municipal well fields. Several District channels also traverse through the City and the District has worked to utilize these water courses for groundwater recharge for the benefit of the City.

The District is also a member of the Kaweah Integrated Regional Water Management Planning group. This group meets regularly to coordinate water management policies and projects.

Most recently, the District has formed a Groundwater Sustainability Agency (GSA) with the aforementioned cities in order to comply with the sustainability requirements of the Sustainable Groundwater Management Act (SGMA). The three partners, bound together by a joint powers agreement, intend to jointly pursue supply-side groundwater management programs as well as extraction strategies which will help sustain the groundwater supplies beneath the region. These programs and strategies will soon be embodied in a Groundwater Sustainability Plan (GSP), and coordinated with other such plans emerging within the Kaweah Sub-Basin.

REVENUES AND EXPENDITURES

During years that the District delivers surface water, on average approximately half of the revenues needed to operate the District come from water sales and the other half comes from land assessments. Over the years, the District has balanced the sales rate for surface water to be competitive with the pumping of groundwater. This provides a cost mechanism to incentivize landowners to utilize surface water over groundwater when it is available. The District has been able to establish a reserve account, which was primarily established through revenues generated through the Districts participation in a hydroelectric power plant at Terminus Dam, water sales to landowners, water sales to outside entities, and contributions from the City of Tulare agreement. This reserve account is utilized to purchase surplus water when available in wet years for groundwater recharge purposes.

During drought years, such as during 2012-2015, the District endeavors to minimize budget expenses to offset the lack of water-sale and power generation revenues. The District has also been creative and utilized staff to accomplish projects for neighboring agencies that can offset some labor and equipment costs. Lastly, the District also has worked on grant-funded water management projects and facilities, whereby the grants cover approximately half of the labor, materials and equipment used on the project.

LONG TERM DROUGHT MANAGEMENT PROGRAM

This Drought Management Plan addresses water management during periods that fall under drought conditions. This section of the Drought Management Plan shall document and establish the activities that take place during non-drought periods that have a subsequent impact on periods that are dominated by drought conditions. Throughout the District there are a number of ongoing activities related to drought management; however, they may not take place within any given drought year.

WATER MANAGEMENT ACTIVITIES

The District operates as a conjunctive-use district whereby surface water supplies are utilized to meet grower demands, and in years where surface water supplies are in shortage, growers can use groundwater to meet crop demands. In high precipitation years (wet years) with attendant surplus supplies, the District utilizes its surface water distribution system and an array of groundwater recharge basins to replenish the underlying groundwater aquifer system that is depended upon during drought years. The District has access to approximately 1,250 acres of recharge basins and over 300 miles of canals to conduct recharge activities.

The District has two surface water supply sources that are utilized by growers. The first supply is a local surface water supply from pre-1914 appropriative rights on the Kaweah River, which supplies are regulated within Lake Kaweah. The second supply is imported from the Central Valley Project from Millerton Lake on the San Joaquin River, which is secured by a Class 1 and Class 2 supply contract with USBR. Together the District averages a surface water supply of approximately 180,000 AF per year. The District can experience years where zero surface water is supplied and also experience years where up to 350,000 AF is diverted for both water sale deliveries and groundwater recharge. This variable nature in surface water supplies is buffered by the conjunctive use of groundwater.

To sustain its conjunctive operations, the District has implemented several different long-term drought management strategies that center around the conjunctive-use of surface water and groundwater. The list of facilities and management programs outlined below includes the recently-implemented strategies that are taking place within the District:

- An effort to increase the number of recharge basins located within the District that are located on highly permeable soils and hydraulically connected to aquifers that are used by District landowners. Over the last 7 years the District has acquired and/or is in the process of developing approximately 220 acres of recharge basins with potential recharge capacity of 110 AF per day.
- The District has also initiated a basin maintenance program in the existing recharge basins to maintain and ideally increase the infiltration capacity at each basin. This program is being furthered by a study that is taking place that will deliver a report that helps identify best management practices for basin maintenance such that the District can increase its recharge capacity and maintain a high infiltration rate over time.
- The District has sought surface water exchanges with other irrigation districts that increase the amount of water delivered to the District in wet years for groundwater recharge and in return the District delivers its limited supply of firm water in dry years to partner districts. These leveraged exchanges have netted the District exchanges upwards of 4:1.
- The District has reached agreement with the City of Visalia to utilize wastewater that is treated to a tertiary level for delivery within the District for agricultural proposes. This will supply water to specific regions (northwest quadrant) of the District on a continual basis, including in drought years. The infrastructure to utilize this water has been installed and the City of Visalia is in the process of upgrading their wastewater treatment plant to a tertiary level. The City of Visalia and District hope to be utilizing tertiary treated water to meet grower demands within the District within the next 2 years. The District-City agreement will enable the District to import upwards of 6,000 AF on average of additional CVP water into the Kaweah Sub-Basin for mutual groundwater benefits.
- The District has begun discussion with the City of Tulare to also utilize wastewater from their treatment plant, when their plant achieves a tertiary level of treatment.